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DESCRIPTIONS OF NEW AND CRITICAL NOTES UPON
PREVIOUSLY KNOWN FORMS OF NORTH
AMERICAN OEDIPODINAE (ORTHO-
PTERA; ACRIDIDAE)

First Paper

BY JAMES A. G. REHN

For a number of years it has been one of the author's ambitions, to make a thorough and comprehensive systematic study of the forms of the genera of that section of the North American Oedipodinae centering about the genus *Trimerotropis*. From whatever angle we had approached this complex of genera, whether in attempting generic studies, the presumably much simpler determination of scattered material or in detailed faunistic studies, it speedily became evident that the classification left much to be desired in the way of interpreting the true valuation of characters, appreciation of variation, relationship of forms and generic affinities, as well as the generic position of certain species. The difficulties encountered tended to concentrate our attention upon these genera, and the opportunity to study the problem in the desired fashion was something for which we continually strived.

The greatest desideratum was material and for over twelve years the field work of Hebard and Rehn has had this proposition as one of its main objectives. We now have before us for study a series of specimens of the genera under consideration, running into the tens of thousands, by far the greater portion collected by Hebard and Rehn and with full field data. After extensive series, type examination was next in importance, and we feel fortunate in having been able to examine, or now have in our possession, by far the majority of the types of the forms of the genera, at least as far as they are known to be in existence.

The critical work upon our projected study has been under way for some months, and in certain genera all the comparative work has been completed. Our plan is to publish in the course of a few years an extensive detailed work upon the genera studied,

but as it is desirable for various reasons to bring out the descriptions of the new forms already located, and certain of our conclusions relative to the relationship of some of the previously known ones, we are introducing them in the present form.

The types of all the new forms here described are in the Hebard Collection, and the paratypical material is in that collection and that of the Academy of Natural Sciences of Philadelphia.

Our earnest thanks are due our colleague, Mr. Hebard, for many helpful suggestions, and also for the gift of the colored plate accompanying this paper.

The Haydenii Group of the Genus Derotmema

We find this group consists of three geographic races or subspecies, for which the oldest, and consequently the specific, name is *haydenii* of Thomas.¹ Scudder's later *cupidineum*² is a pure synonym of *haydenii*, as type examination shows. Saussure's *brunnerianum*³ is another pure synonym of *haydenii*, which latter name was apparently unknown to Saussure at that time. Typical *haydenii* is the race of the Great Plains region from Montana to New Mexico.

In the Great Basin and Snake River regions we find a related form which intergrades with *haydenii haydenii* in Wyoming, and to this Saussure's name *riley anum*⁴ is applicable, as material from the type locality and the original lot shows. Scudder,⁵ by an interpretation of his *cupidineum* not warranted by his original description or material, shifted his name to this Great Basin form, where it clearly does not belong. The Great Basin race must be known as *Derotmema haydenii riley anum*.

In western Texas and northern Mexico we find a third geographic race, which occurs typical in the Great Bend country of trans-Pecos Texas, north to Marfa and Sierra Blanca, occasionally not fully typical at the latter locality, and, at Marathon, Texas,

¹ *Oedipoda haydenii* Thomas, Ann. Rep. U. S. Geol. Surv. Terr., v, p. 460, (1871). ["Above Fort Fetterman on the North Platte," Wyoming.]

² *Derotmema cupidineum* Scudder, Ann. Rep. Chief of Engineers, 1876, p. 513, (1876). [Northern New Mexico.]

³ *Derotmema brunnerianum* Saussure, Prodr. Oedipod., p. 155, (1884). [Colorado.]

⁴ *Derotmema riley anum* Saussure, Prodr. Oedipod., p. 156, (1884). ["Salm County" [Salmon City], Idaho.]

⁵ Proc. Amer. Acad. Arts and Sci., xxxv, no. 19, 391, (1900).

to the eastward showing a marked Great Plains influence in instability of features and tendency toward *D. h. haydenii*. Southward in Mexico it is known to occur as far as Camacho, Zacatecas. This subspecies is new and is here described.

Derotmema haydenii mesembrinum⁶ new subspecies Plate XXVI, figs. 1 and 2; plate XXVIII, figs. 1 and 2.)

This race is more nearly related to *D. h. haydenii* (see plate XXVI, figs. 3 and 4; plate XXVIII, figs. 3, 4, 5 and 6), from which it is chiefly separable in the male sex having the eyes larger, more prominent and protuberant, more circular in basal outline and deeper in proportion to the infra-ocular portion of the genae, and in the slightly broader pronotum; in the female sex it can be distinguished by the eyes being slightly more prominent and the pronotum distinctly broader, particularly the metazonal portion of the disk. From *D. h. rileyianum* (see plate XXVIII, figs. 7 and 8) the present race differs in the male sex having more prominent eyes, which are somewhat more elevated, although not as rounded in basal outline, more prominent fastigio-facial angle when seen in profile, and in the prozonal lobes of the median carina of the pronotum being of the type found in *D. h. haydenii*; in the female sex differing much as in the male sex, but with features less decidedly indicated, also in the pronotum having the metazona appreciably broader and in general more deplanate on the disk.

Type.—♂; Double Windmill,⁷ Brewster County, Texas. Elevation, 2725 feet. September 3, 1912. (Rehn and Hebard.) [Hebard Collection, Type no. 490.]

Description of Type.—Agrees fully with virtual topotypes of *D. h. haydenii*⁸ except in the following characters. Eyes more globose, when seen from dorsum with width across eyes very appreciably greater than width of metazonal disk, in profile more circular and depth and width more nearly subequal, instead of appreciably deeper than wide, as in the typical form of the species; in cephalic aspect appreciably more protuberant, making width across eyes decidedly greater, instead of but moderately greater, than greatest width across genae. Pronotum with the metazona of disk slightly more transverse.

Allotype.—♀; Marfa, Presidio County, Texas. Elevation, 4650 to 4750 feet. September 1, 1912. (Rehn and Hebard.) [Hebard Collection.]

⁶ From *μεσημβρινον*, *southern*.

⁷ Appearing on the recent government topographic map as "Twin Mills."

⁸ From Casper, Wyoming.

Description of Allotype.—This sex differs from virtual topotypes of the same sex of *D. h. haydenii* in the following characters. Eyes slightly more prominent and globose when seen from the dorsum, with width across eyes faintly greater than, instead of subequal to, the width of metazonal disk, in profile as in male sex; in cephalic aspect slightly more protuberant, making width across eyes subequal to, instead of slightly less than, the greatest width across genae. Pronotum with the metazona of the disk broad, relatively short, greatest width across same nearly equal to greatest length of pronotum.

Coloration of type and allotype not distinctive, when compared with *D. h. haydenii*. Both red and yellow disks are present on the wings, as in the typical form of the species.

Measurements (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotal disk	Length of tegmen	Length of caudal femur
♂					
Double Windmill, Texas, <i>type</i>	15.1	3.3	2.7	15.8	8.9
Double Windmill, Texas, <i>para-</i> <i>type</i>	15.4	3.2	2.7	17	9
Marfa, Texas, <i>paratype</i>	15.4	3	2.8	17.9	10.2
Puertacitas Mountains, Texas, <i>paratype</i>	15.8	3.4	3	17.5	9.4
♀					
Marfa, Texas, <i>allotype</i>	23.8	4.8	4.5	25	12.5
Persimmon Gap, Texas, <i>para-</i> <i>type</i>	23.6	5	4	24	13

Specimens Examined: 46; 18 ♂, 28 ♀.

TEXAS: Sierra Blanca, El Paso County; Puertacitas Mountains and Marfa, Presidio County; Double Windmill and Persimmon Gap, Santiago Mountains, Brewster County and Marathon, Brewster County.

COAHUILA: Monclova and Jimulco.

DURANGO: Lerdo.

ZACATECAS: Camacho.

A male from Double Windmill, bearing the same data as the type; a male from Marfa with the same data as the allotype; a male from Puertacitas Mountains, Presidio, Texas, elevation 5100 to 5200 feet, August 30, 1912; and a female from Persimmon Gap, Santiago Mountains, Brewster County, Texas, September 3, 1912, are designated paratypes. All of these specimens were collected by Rehn and Hebard.

The Mexican specimens are typical of this race, as are all the paratypic individuals. The Sierra Blanca specimens (four males, eleven females) are practically typical, occasional individuals showing *D. h. haydenii* influences. The Marathon series (eight

males, ten females) is virtually intermediate between the typical form of the species and the race here described. These specimens are variable individually from a truly intermediate condition to practically typical *D. h. mesembrinum*. From this information the area of typical *mesembrinum*, and the points at which intergradation becomes evident, can be determined.

The present subspecies was always found on adobe soil, generally bare, but occasionally with scattered bushes and grass. Double Windmill is in the middle of the broad Maravillas Valley between the Santiago Mountains and the high broken country to the east, an extremely arid and very hot locality, an uninhabited watering station on the Marathon-Boquillas road, about forty miles south of Marathon.

Derotmema piute new species⁹ (Plate XXVI, figs. 5, 6, 7 and 8; plate XXVIII, figs. 9, 10 and 15.

This striking species is related to *D. delicatulum* and *laticinctum* Scudder, but is more removed from the latter than from the former. There is no close relationship with *D. haydenii* or *sauseanum*.

From *delicatulum* the new species can be separated by the more robust form, more distinctly vertical face with very weak interantennal angle profile, proportionately broader head when seen in cephalic aspect, more strongly transverse pronotum, the tegmina more appreciably narrowed distad when compared with the width of their proximal half, very ample anal field of tegmina, slightly broader wing, shorter and more robust caudal limbs, the abbreviation being shared by the tarsal joints, and the generally distinct and more complete transverse banding of the tegmina and caudal limbs. From *laticinctum*, *piute* can be separated by the slightly more vertical face, slightly more prominent eyes, which are more circular in basal outline, smoother pronotal surface, more regularly angulate caudal margin of pronotal disk, narrower lateral lobes of the pronotum, the shorter, broader and more distally narrowed tegmina, the broader wing, which has the band always narrower and much weaker, the shorter and more robust limbs, and, in the female sex, in the more slender and straighter ovipositor jaws.

⁹ Named for the Indians native to the Walker River region and adjacent country of Nevada.

Type.—♀; Mason, Lyon County, Nevada. Elevation, 4500 feet. September 5, 1910. (Rehn and Hebard.) [Hebard Collection, Type no. 493.]

Description of Type.—Size relatively small: form robust, tegmina and wings shorter and broader than usual in genus: surface dull; tegmina almost entirely coriaceous, briefly subhyaline distad.

Head relatively large, broad: occiput moderately elevated in profile, interspace between eyes dorsad subequal to transverse width of eye: fastigium strongly and regularly arcuate declivent, broad, very shallowly arcuate-excavate, lateral margins weakly but appreciably elevated, in outline subovoid, greatest width ventro-cephalad, median carina distinct but very low: frontal costa moderately broad (for genus), in general moderately expanding ventrad, obsolete ventrad on face, margins bisinuate and constricted dorsad of the insertion of the antennae and ventrad of the median ocellus, continuous with fastigial margins; costa of moderate width at junction with fastigium, weakly and incompletely sulcate, V-shaped impression at fastigial junction distinct, acute: in profile fastigium regularly passes into facial outline, latter nearly vertical, very weakly arcuate; interantennal projection slightly arcuate: width of head across genae faintly less than that across eyes: eyes very prominent, in basal outline nearly circular, slightly flattened dorsad, the depth very faintly greater than that of the infra-ocular portion of the genae; from cephalic and dorsal aspects the eyes are seen to be quite prominent: antennae slightly more than three-fourths as long as caudal femora, slender.

Pronotum broad and short, the greatest width across metazona of disk subequal to greatest length, subsellate in form, surface largely rugulose, pale areas on lateral lobes relatively smooth; transverse sulcus almost straight, intersecting median carina at about middle: cephalic margin of disk arcuate produced mesad; caudal margin of disk obtuse-angulate, the margin regularly and evenly converging to the apex, which is very weakly rounded: median carina low and carinulate cephalad on prozona, subarcuate in profile, obsolete caudad on prozona, with the group of three tubercles found in some species of the genus represented by low bosses on a transverse fold; median carina of metazona delicately carinulate, low: surface of metazona with rugulosities to some extent connected and erratic: lateral carinae not evident on prozona, very weak but evident on the rounded metazonal humeral shoulders: lateral lobes slightly deeper than broad; caudal margin gently arcuate from humeral angle to the broadly arcuate ventro-caudal angle; surface of metazona of lobes cribroso-reticulose.

Tegmina three times as long as head and dorsum of pronotum combined, broad proximad, their width there but slightly less than length of pronotum, narrowed distad, the width at distal sixth subequal to length of metazona of disk: costal margin of tegmina straight from costal lobe to briefly proximad of apex, i.e. point measured above, thence to rounded apex arcuate; sutural margin straight in the greater portion of its length, the sutural and costal margins moderately converging distad: anal field of tegmina relatively broad, proximad

nearly equal in width to length of prozona, regularly narrowing distad, reaching practically to the tegminal apex. Wings relatively broad, greatest width contained slightly less than twice in length.

Mesosternal interspace strongly transverse, cephalic margin of interspace very weakly obtuse-angulate, internal angle of lobes rounded rectangulate, caudal margin of lobes obliquely truncate: metasternal interspace not narrower than mesosternal interspace, strongly transverse, shallow, cephalic margin arcuate, lobes angulately converging caudad. Ovipositor jaws moderately compressed; dorsal valves moderately upcurved in distal third, ventral valves gently arcuate decurved in distal half.

Cephalic and median limbs of medium length, slender, the femora appreciably enlarged distad. Caudal femora faintly more than two and one-half times as long as dorsum of pronotum, moderately robust for the genus, the greatest depth contained slightly more than four times in greatest length; dorsal carinae faintly sublamellate in proximal half; external paginal pattern regular: caudal tibiae slightly shorter than femora, slightly sinuate proximad, armed on external margin with eight, internal with ten to twelve spines: caudal tarsi short, second and third joints together subequal in length to the proximal joint.

Allotype.—♂; same data as type. [Hebard Collection.]

Description of Allotype.—Differing from female sex in the following noteworthy features.

Size small: tegmina more extensively subhyaline, a considerable portion of distal half of such structure.

Head with least width of interspace between eyes equal to three-fourths of transverse width of eye: frontal costa with supra-antennal constriction much more decided than in female, there narrowly but distinctly and below broadly but appreciably sulcate: width of head across genae three-fourths of width across eyes: eyes very prominent, slightly exserted, the depth slightly but appreciably greater than that of infra-ocular portion of genae: antennae in length subequal to caudal femora.

Pronotum with surface smoother, less rugulose and more shagreenous than in female: median carina slightly higher and more angulate in profile than in female; tubercles caudad on prozonal disk more distinct and acute; lateral carinae obsolete on metazonal shoulders: lateral lobes with metazona cribroso-shagreenous.

Tegmina slightly less than three times as long as head and pronotum combined.

Mesosternal interspace with cephalic margin of interspace subtruncate: metasternal interspace slightly narrower than mesosternal interspace.

Caudal femora with greatest depth contained slightly less than four times in length of same: caudal tibiae with eight spines on external margin and ten spines on internal margin.

General pale tone of dorsal coloration varying from pale tilleul-buff, through pinkish buff to vinaceous-pink, the face, genae, much of the lateral lobes, portions of pleura and pale areas on cephalic and median limbs and on external face of caudal femora hoary white. Darkened markings of occiput, pronotum, tegmina and limbs ranging from bister to mummy brown: on the pronotum this is usually restricted to a darker edging at the irregularly angulate junction of the hoary ventral portions and colored dorsal section, this brown edging occasionally being isolated from the dorsum of the pronotum by additional hoary white, which in a single specimen (one female; Mason, Nevada) includes most of the dorsum; occasionally the dorsum and much of the pronotal lateral lobes is somberly uniform brownish (both Mina females); tegmina with dark maculations relatively small and quadrate, frequently weakly grouped into two principal transverse bands, one proximal and the other mesal, the proximal the more solid, the intervening pale areas and distal section with scattered maculations, which show tendencies, when grouped at all, to assemble along the sutural margin and the humeral trunk. In the dully colored individuals from Mina and several weakly contrasted specimens from Mason, the tegmina, and for that matter the pronotal markings, are little evidenced. Wings with disk varying from very pale naphthaline yellow to pale citrine yellow, the color never decided and dilute peripherad; distal portion clear hyaline except for vein infuscation; wing band ranging from the faintest trace in a relatively few cells, with no spur, to a fairly well-marked and moderately broad band, with a connected, well-marked spur, extending half way to wing base, the band becoming obsolescent periphoro-proximad; in color the band ranges from raw umber to mummy brown. Rarely a distinct band and a well indicated spur are present but not connected. Eyes ranging from ochraceous-orange through buckthorn brown and tawny to dresden brown and mummy brown. Antennae whitish pink, broadly annulate with blackish brown, this condition subobsolete distad. Cephalic and median limbs annulate with blue-black (intensive) to fuscous (recessive); caudal femora with the dark bars of similar color, oblique on external face and there occasionally incomplete, distinct dorsad. Caudal tibiae pale, external face with a distal, a pre-median and a proximal darkening of variable intensity and definition, internal face faintly washed with pale veronese green to glaucous blue, increasing in intensity distad. Venter and abdomen light buff to light ochraceous-buff, the surface often with numerous scattered small blotches of buckthorn brown. Dorsum of abdomen proximad french green to empire green.

The Mason series is, as a whole, sharply, brightly and contrastingly colored; the Mina representation is duller, the females quite dull, with little contrast, while the male is more contrasted, but duller than the Mason specimens. The extremes of wing band condition are found in the Mina males.

Measurements (in millimeters)

	Length of body	Length of pronotum	Greatest caudal width of pronotal disk	Length of tegmen	Length of caudal femur
♂					
Mason, Nevada, <i>allotype</i>	15	3.3	2.7	14.5	8.9
Mason, Nevada, <i>paratype</i>	13.2	2.9	2.7	14.5	8.4
Mina, Nevada, average of seven <i>paratypes</i>	14.3 (13.7-15.5)	3.1 (3-3.4)	2.5 (2.4-2.8)	14.9 (14.2-16)	8.5 (8.2-9)
♀					
Mason, Nevada, <i>type</i>	20.4	4.1	3.5	19	10.4
Mason, Nevada, average of six <i>paratypes</i>	20 (18.5-21.2)	4.1 (4-4.3)	3.4 (3.2-3.7)	18.8 (18.2-19.8)	10.4 (10-11.2)
Mina, Nevada, <i>paratype</i>	20.5	4.2	3.4	19	9.9
Mina, Nevada, <i>paratype</i>	20.8	4	3.4	19	10.5

In addition to the type and allotype we have before us one male and six females bearing the same data as the type, and seven males and two females taken at Mina, Mineral County, Nevada; elevation, 4350 feet; September 3 and 4, 1910; (Rehn and Hebard.). All the specimens here recorded, in addition to the type and allotype, are considered paratypes.

In structure the series shows certain features of variation. The pronotum, as usual in any series of the species of the genus, shows some variation in breadth to length, in one extreme being slightly longer than greatest breadth across the metazona of disk. The frontal costa shows a slight degree of variation in the strength of the constrictions and in the continuity of the sulcation, while the lateral carinae vary in their indication, being occasionally obsolete in the male and never stronger than in the type. The median carina of the pronotum is weakly variable in the arcuation of the cephalic portion of the prozonal section, and in the degree of indication on the caudal portion of the same section. The tegmina vary from three to over three times in length of head and pronotum combined, while the wings are occasionally broader than in type, being one and six-tenths times width in length. The mesosternal interspace has the cephalic margin varying from

as described to nearly straight, while the lobe angles vary in the extent to which they are rounded. The caudal femora have the depth varying from three and one-half to slightly more than four times in the length. The caudal tibiae have from seven to nine external, and from eight to twelve¹⁰ internal marginal spines.

At Mason the species occurred on a gravelly alluvial slope with fairly heavy but scattered bush vegetation, and also in a depression of the slopes with similar cover. The species was scarce in the former situation, and more numerous, but not common, in the latter location. At Mina the insect occurred in but one environment, this was on ground strewn with rock fragments, the general location being to the east of the broad playa in the middle of the valley in which Mina is located, and where there is a similar but sparser vegetation than found at Mason. The species was not common, and individuals were secured only after long and careful search.

The Plattei Group of the Genus Mestobregma

This group is composed of two sections, one comprising *plattei* and its races and the second composed of *impeyum* and *terricolor*, both of the latter very distinct new species, here described.

The races of *Mestobregma plattei* number three. These are: *plattei plattei*,¹¹ which is the form of the Great Plains region, south to southern Colorado; *plattei corrugata* (Scudder),¹² ranging from northern New Mexico southward, and *plattei rubripenne* (Bruner)¹³ of central and southern Arizona. In our detailed projected study of the genus we will discuss the relationship, synonymy and variation, as well as detailed distribution, of these forms.

The *impeyum-terricolor* section of the group is moderately cohesive, made up of the two species, which agree in eye outline, and to a certain degree in pronotal form, but differ in the form of the frontal costa, fastigio-facial angle, mesozonal carina, length of lateral lobes and general form. *Impeyum* is nearer *plattei* than *terricolor*, and the latter is an evident tendency toward *Trepidulus*, yet in all general features it is a true *Mestobregma*.

¹⁰ The latter on one margin in type only.

¹¹ 1873. *Oe(dipoda) plattei* Thomas, Rep. U. S. Geol. Surv. Terr., v, p. 123. ["Near Platte River in Colorado and Wyoming."]

¹² 1902. *Conozoa corrugata* Scudder, in Scudder and Cockerell, Proc. Davenport Acad. Sci., ix, p. 33. [Fillmore Canyon, Organ Mountains, New Mexico.]

¹³ 1905. *Trachyrhachis rubripennis* Bruner, Biol. Cent.-Amer., Orth., ii, pp. 175, 177. [Oracle, Arizona.]

Mestobregma impexum¹⁴ new species (Plate XXVI, figs. 9 and 10; plate 13 and 14.)

1910. *Mestobregma rubripenne* Rehn and Hebard (not of Bruner, 1905), Proc. Acad. Nat. Sci., Phila., 1909, p. 442. [Cima and Bird Spring Mountains, California.]

The present species can be separated from the component races of *Mestobregma plattei* (see plate XXVI, figs. 11 and 12; plate XXVIII, figs. 11 and 12) by its more robust form, more circular basal eye outline, the much less angulate, fastigio-facial angle when seen in profile, and by the sharp and decided constriction of the frontal costa briefly dorsad of the antennal bases. From *M. terricolor*, here described, the present species differs in the more inflated genae, the less decided fastigio-facial angle when seen in profile, in the frontal costa constriction, in the more distinct mesozonal section of the pronotal median carina, in the shorter lateral lobes of the pronotum, the shorter and more robust form and more contrasted coloration.

Type.—♂; Milford, Beaver County, Utah. Elevation, 4900 to 5000 feet. September 5, 1909. (Rehn and Hebard.) [Hebard Collection, Type no. 494.]

Description of Type.—Size medium: form slender, subcompressed: pronotum rugose on dorsal surface.

Head moderately inflated, the genae moderately bullate and with the width across same slightly more than greatest width across eyes: occiput and vertex, when seen from side, distinctly arcuate, ventro-cephalad markedly and sinuately arcuate declivent to the rounded and weakly indicated fastigio-facial angle, which is situated between the antennal bases; face subvertical: fastigium with length and breadth subequal, very shallowly excavate; lateral carinae of fastigium low but clearly marked, subparallel caudad, converging cephalad to about one-half their median separation, the cephalic margin of the fastigium indicated by a more weakly defined, narrowly V-shaped carina, the apex directed caudad: frontal costa appreciably V-foveolate dorsad at its junction with the fastigium, the foveolation in contact with the V-shaped carina of the fastigium, immediately ventrad of this the costa is first strongly, although regularly, constricted, then arcuately expanded between the antennae, at the constriction and dorsad to the foveolation with an appreciable median carina, ventrad of inter-antennal region very faintly constricted, then with margins weakly diverging and becoming obsolete before reaching the clypeal suture; marginal carinae of frontal costa distinct but low, surface of costa ventrad of foveolation very weakly excavate: lateral facial carinae strongly arcuate divergent. Eyes moderately prominent, not elevated dorsad of vertex when seen in cephalic aspect; basal outline very broad ovate, in depth subequal to the infra-ocular sulcus. Antennae slender, nearly twice the

¹⁴ Rude, uncouth—from the rough appearance of the pronotal disk.

combined dorsal length of the head and pronotum, subequal in width, subdepressed proximad.

Pronotum weakly sellate, sub-strangulate, with dorsum rugose, the dorsal length faintly less than the dorsal length of the head, the greatest (caudal) width of the disk but slightly less than the greatest dorsal length: cephalic margin of disk very weakly, though finely, obtuse-angulate; caudal margin of disk sub-rectangulate, the immediate angle narrowly rounded, the margin appreciably cingulate: median carina distinct but not high on the metazona, elevated and moderately bilobate on the prozona, the cephalic section of this about half again as long as the caudal (or mesozonal) one, the former but little higher than the latter and subdeclivent cephalad, the caudal (or mesozonal) section more regularly arcuate; lateral carinae indicated by converging, low, irregular elevations cephalad on the prozona, on caudal (or mesozonal) section of prozona is a distinct, transverse raised area with a pair of impressed pits, lateral shoulders on metazona distinct, rather prominent, noncarinate: metazona slightly longer than the prozona. Lateral lobes of pronotum deeper than long, ventral margin sinuate, the greatest depth caudad, caudal margin sinuate, the greatest width of lobe ventrad, the ventro-caudal angle full and rounded.

Tegmina surpassing the apex of the abdomen by about four-fifths the length of the caudal femur, greatest width contained slightly more than five times in greatest length of same; costal margin with a distinct, but low and relatively short, proximal lobation, distad distinctly arcuate to the rounded acute apex; sutural margin in general subparallel to costal; distal margin obliquely arcuato-truncate: texture coriaceous proximad, becoming more membranous and less closely areolate in distal fourth: intercalary vein present, proximad nearer the ulnar, distad nearer the median vein. Wings moderately long, greatest width contained one and three-quarter times in length of same; apex rounded rectangulate.

Interspace between mesosternal lobes strongly transverse, shallow, the lobes obliquely arcuato-truncate caudad: interspace between metasternal lobes strongly transverse, but little narrower than mesosternal interspace, regular.

Cephalic and median limbs moderately slender. Caudal femora about half as long as the tegmen, of the form usual in the subfamily, greatest width contained three and one-half times in the length, with the lamellation of dorsal carina little indicated and not sharply terminated distad, as in most of the individuals of the genus; pattern of the external paginae regular: caudal tibiae slightly shorter than the caudal femora, armed on the external margin with ten spines and on the internal margin with eleven spines: caudal tarsi relatively short, the metatarsus subequal in length to the other two joints combined.

Allotype.—♀; same data as type. [Hebard Collection.]

Description of Allotype.—Differs from the description of the type in the following noteworthy features.

Size rather large: form slightly more robust: surface more rugulose, and of dorsum of pronotum more extensively rugose. Head with whole facial profile, including fastigio-facial angle, less bulging, more regularly low arcuate, with barely appreciable sinuosities: width across genae about one and a third that

across eyes, the genae being moderately bulging; structure of fastigium and frontal costa as in male, but the whole structure broader in proportion. Eyes distinctly smaller in proportion, in depth appreciably shorter than the infra-ocular sulcus. Pronotum slightly longer in proportion to the head: caudal margin of the disk with apex more rounded and lateral portions faintly arcuate-emarginate. Ovipositor jaws moderately slender. Caudal femora with dorsal lamellation more evident and more appreciably excised distad than in male.

Measurements (in millimeters)

♂	Length of body	Length of pronotum	Greatest (caudal) width of pronotal disk	Length of tegmen	Length of caudal femur
Milford, Utah, <i>type</i>	17.7	3.6	3.4	20.4	10.5
Milford, Utah, <i>paratype</i>	18.2	4.2	3.5	20.2	10.7
Milford, Utah, <i>paratype</i>	19.5	4.2	3.7	22	11.1
Cima, California	19.4	3.9	3.6	20.6	11.2
♀					
Milford, Utah, <i>allotype</i>	32	5.5	4.9	24.5	13.7
Milford, Utah, <i>paratype</i>	29	5.1	4.5	24.5	13.4
Milford, Utah, <i>paratype</i>	31	5.3	5	26.8	13.5
Cima, California	25.3	4.7	4	23.2	13
Cima, California	26	5	4.3	25.5	13.6
Bird Spring Mountains, California	24 ¹⁵	5	4.5	24.5	12.7

Color pattern of the type found in *Mestobregma plattei*, with sharply contrasted bicolored lateral lobes of the pronotum and *Conozoa*-like contrasted barring on the costal half of the proximal three-fifths of the tegmina. Pale base color ranging from pale clay color to light buff, occasionally in large part, particularly on the head, hoary white; dark pattern color ranging from mummy brown to dark bone brown. Frequent specimens from Milford show a castor gray suffusion, to variable degrees, of the greater portion of the head and dorsum of the pronotum, or of the dark areas alone, and rarely, to an extent, on the lateral lobes of the pronotum. The type shows a tendency in this direction on the dark areas of the dorsum of the head. The transverse dark infra-antennal facial line is smoke black in the male sex, and variable in depth of color, while mesad its costal portion is either lacking or more ventral in position than laterad of the costa. In the female sex this bar is obsolete or subobsolete. Eyes ranging from ochraceous tawny to deep mars brown. Antennae with joints distad of the second fuscous, obscurely alternated (by segments) with dull russet. Pronotum with dark angulate marking on lateral lobes in male sharply contrasted, shining dark bone brown, much weaker in female; dorsum dull, with little contrast. Tegmina with dark bars always sharply contrasted with pale interspaces; sutural section and distal two-fifths with numerous areolate patches of the darker color. Wings with disk in yellow-winged phase ranging from very weak marguerite yellow (*type*) to primrose yellow, in the red-winged phase it is coral red; wing-band dark bone brown, crossing the

¹⁵ Abdomen abnormally contracted.

wing slightly distad of the middle and following the peripheral margin to as much as half-way to the body, spur broad, heavy, extending more than half-way to the base, costal margin free from spur and of the disk color; distal portion hyaline with few scattered brown areas near margin and along certain of the veins. Limbs with the usual barring of the group, the caudal femora frequently with much hoary white, rarely suffused, on dark areas, with castor gray; caudal tibiae olive buff to bluish glaucous, mottled with brownish proximad, dorsal surface in glaucous type darkened to russian blue, spines black-tipped on bone brown, bases of same of tibial color. In the infrequent castor gray suffused individuals the caudal tibiae are much mottled with this color.

In addition to the type and allotype we have before us eight males and three females taken at Milford, Utah, September 5, 1909, by Rehn and Hebard. We also have for study one male and three females from Cima, San Bernardino County, California, taken August 12, 1907, by Hebard, and one female from the foothills of the Bird Spring Mountains, San Bernardino County, California, taken August 11, 1907, also by Hebard. The Cima and Bird Spring Mountains material was previously recorded by us as *Mestobregma rubripenne*,¹⁶ to which the present species is closely related, but quite distinct. The Milford series we here designate as paratype.

In the series examined, we find some little variation in the Cima male, which has the fastigio-facial angle, in profile, more evident and angulate than in the others; the eyes and costa, however, are typical. Of the Milford series two of the males are red-winged, the remainder, of both sexes, are yellow-winged. One Cima female is red-winged, the remainder and the Bird Spring Mountains individual are yellow-winged. The species was scarce at Milford, occurring on sage covered ridges at 5000 feet and on relatively bare slopes, with scattered sage and yellow-flowered bushes, at 4900 to 5000 feet elevation.

Mestobregma terricolor¹⁷ new species (Plate XXVI, figs. 13, 14 and 15; plate XXVIII, figs. 16 and 17.)

This interesting species is more nearly related to *D. impexum*, here described, than to any other of the genus. It forms with *impexum* a section of the *plattei* group of the genus, and can be distinguished from the component races of *M. plattei* by the less

¹⁶ *Vide supra*.

¹⁷ Meaning *earth-colored*, in relation to the general tone of the coloration of the insect in repose.

inflated ventral portion of the genae, when seen in cephalic aspect, in the more circular basal outline of the eye, in the mesozonal portion of the median carina of the pronotum being weak or subobsolete, but the lateral portions of the mesozonal bifoveolate elevation not reduced, the pronotum thus more sellate than in *plattei*, in the median carina on the metazonal portion of the pronotum being weak, and in the lateral lobes of the pronotum being proportionately longer.

From *impexum* the present species can be distinguished by the less inflated ventral portion of the genae, seen in cephalic aspect, in the more subequal frontal costa, which is not sharply constricted immediately dorsad of the insertion of the antennae, the more produced fastigio-facial angle when seen in profile, the less cristate median carina of the pronotum, the smoother pronotal surface, the more slender and elongate form and duller normally exposed coloration.

The beautiful rose-red disk of the wings appears to be a specific character, as we have seen none with yellow disks.

Type.—♂; Pecos, Reeves County, Texas. Elevation, 2596 feet. September 18, 1912. (Rehn and Hebard.) [Hebard Collection, Type no. 496.]

Description of Type.—Size rather small; form slender, elongate, subcompressed dorsad: surface finely rugulose and dull, particularly in depressed areas, smoother in elevated sections, the dull areas with sparse, very short hairs.

Head less inflated than in the related species: occiput, vertex and fastigium in profile regularly arcuate; fastigio-facial angle well marked, narrowly rounded, obtuse, situated between the antennal bases; facial line moderately retreating: fastigium slightly broader than long, broadly open caudad; lateral margins distinct, parallel caudad, concavely convergent cephalad, the cephalic width of the fastigium less than one-half its greatest width, there closed by a V-shaped carina, as described in *D. impexum* but less evident; surface of fastigium shallowly excavate: frontal costa of medium width, very faintly and broadly narrowed dorsad, gently and broadly expanding between the antennal bases to slightly more than the width of proximal antennal joint, very faintly and broadly narrowed ventrad of this, then regularly, though moderately and in a sub-obsolete fashion, expanding to the clypeal suture; surface of frontal costa as a whole considerably sulcate, weakly foveolate dorsad in contact with fastigial V-carina, sulcation becoming obsolete ventrad; carinal margins as a whole sharp; lateral facial carinae arcuate about antennal bases, thence rather strongly divergent to the clypeal angles. Eyes large, prominent, in cephalic aspect they are seen to be very faintly elevated dorsad of the vertex, the width across the eyes slightly greater than that across genae; in lateral outline the eyes are broad subreniform-ovate, their basal outline less in area than their

lateral outline, due to the eye prominence and globosity; greatest depth of the eye subequal to that of the infra-ocular sulcus. Antennae slightly longer than caudal femora, slender, apex acute, proximal joints (beyond two basal ones) appreciably depressed but not expanded.

Pronotum short, subsellate, weakly strangulate. Disk of pronotum with greatest (caudal) width but slightly less than greatest length of same; cephalic margin of disk very faintly angulate; caudal margin of same subrectangulate, the margin cingulate and very faintly sinuate on lateral portions: metazona one-third again as long as the prozona (prozona s. s. and mesozona) section: median carina on restricted prozona distinct and arcuate but not high; on mesozonal section, which is faintly shorter, distinctly lower, partly obliterated and marked by a median point or knob; on metazona the carina is distinct, continuous, though weak, becoming more elevated caudad: transverse mesozonal elevation more evident than that portion of median carina, crudely resembling a figure eight, the caudal section of the margining carina the higher: lateral carinae represented on prozona solely by several detached points, on metazona by prominent but rounded shoulders: surface of metazonal disk with rugulosity scattered and irregularly transverse in disposition; principal transverse sulcus deeply impressed. Lateral lobes of pronotum deeper than long, greatest depth caudad; ventral margin distinctly arcuate-sinuate cephalad, straight caudad; caudal margin broadly but shallowly concave from the disk to near the ventral margin, where the ventro-caudal section is obliquely truncate; surface of metazona of lobes obscurely cribroso-punctulate.

Tegmina surpassing the apex of the abdomen by slightly more than the combined length of the head and pronotum, narrow, the greatest width contained six times in the length: costal margin with a broad and very low proximal lobation, in distal fifth broadly arcuate to the distal margin, which is completely rounded; sutural margin with a weak concavity distad, corresponding in a lesser degree to the arcuation of the costal margin: texture of the proximal half of the tegmina opaque, gradually becoming more translucent and with sparser areolation distad, but nowhere hyaline: intercalary vein indicated, proximad nearer the ulnar vein, distad intermediate between the ulnar and median veins; axillary vein free. Wings relatively narrow, the greatest width contained twice in the length; apex of anterior field narrowly rounded, axillary field with margin broadly and obliquely arcuate-lobate.

Interspace between the mesosternal lobes strongly transverse, the lobes with their caudal and medio-caudal margin obliquely arcuate; interspace between the metasternal lobes appreciably less than that between the mesosternal lobes, transverse.

Cephalic and median limbs moderately slender. Caudal femora slightly more than half as long as the tegmina, of medium robustness, the greatest depth contained about three and one-third times in the greatest length of the same; dorsal carina but little lamellate; external pagina with pattern relatively regular: caudal tibiae appreciably shorter than the femora, armed on the external margin with nine to ten spines, on internal margin with eleven to twelve spines: caudal tarsi quite short, the metatarsus faintly shorter than the remaining joints combined.

Allotype.—♀; same data as type. [Hebard Collection.]

Description of Allotype.—Differing from the description of the type in the following noteworthy features. Size larger. Head with fastigio-facial angle much less prominent in profile, rounded; facial line less retreating; eyes less prominent, in cephalic aspect not elevated dorsad of level of vertex, greatest depth slightly less than that of infra-ocular sulcus. Pronotum with rugulosities of metazonal disk more detached, individual and irregular than in male; ventro-caudal portion of lateral lobes of pronotum more rounded and less oblique truncate than in male. Tegmina surpassing the abdominal apex by less than the length of the pronotal disk. Wing very faintly less than twice as long as broad. Mesosternal lobes less obliquely arcuate than in male, the medio-caudal angle more distinct, though arcuate. Ovipositor jaws relatively short, well recurved, moderately compressed.

Color pattern of the basic *M. plattei* type, but greatly modified by the suppression of virtually all solid exposed dark markings, except the undulate dark line on the lateral lobes of the pronotum and reduced dark blotches on the costal section of the proximal half of the tegmina. General color ranging from warm buff to tawny, often light buff or even hoary white on the head, ventral section of the lateral lobes of the pronotum and cephalic limbs. Dark markings bone brown to clove brown, the pronotal line somewhat shining. Head with a sub-obsolete, fine postocular line and a transverse, weak vertex line of darker, occasionally many cloudings and mottlings present on the genae, occiput and face; eyes antimony yellow to yellow ocher, with several irregularly marked oblique lines of brown: antennae with distal half solid blackish brown; proximad half of the general color, irregularly multi-annulate with blackish brown except on the two proximal segments. Pronotum with median section of disk occasionally weakly clouded with brownish, the caudal margin beaded with, and the carinal and mesozonal elevations touched with, brown: lateral lobes with dark undulate line indicated as distinctly in females as in males. Tegmina with *Conozoa*-like patches of dark brown always evident, occasionally¹⁸ nearly confluent, usually separated by a pale interspace somewhat less than their width, the dark patches not crossing the humeral trunk; distal half of tegmina and discoidal and anal fields with scattered punctulations of dark brown, which distad are areolate and rarely there disposed in an obscure transverse fashion, in the anal field there rarely is a weak transverse barring tendency in the disposition of the punctulations. Wings with disk jasper red: wing-band bone brown, crossing the wing at or very slightly distad of the middle, narrowed and emarginate at the base of the spur, which is broad and extends about two-thirds the way to the base of the wing; peripheral margin with band becoming obsolete half-way to the body: distal section of wing hyaline, with certain veins infusate by pencilling or series of dots; costal margin infusate distad, from band to near the apex; proximad of same narrowly lined with disk color. Abdomen of general color, as a rule with a more yellowish tendency; dorsum of abdomen frequently with proximal segments clouded to a variable degree with dark payne's gray. Cephalic and median limbs

¹⁸ In Grand Canyon female.

usually with narrow incomplete annular patches of blue-black to blackish. Caudal femora with one distinct and several indistinct dark patches on the dorsal surface, external face often quite hoary white, ventral carinae irregularly beaded with brown: caudal tibiae on normally exposed surfaces of general color, on normally hidden surfaces tyrian blue to deep orient blue; spines black tipped on brown.

The Pecos series is quite uniform in general coloration, the wing-band varying somewhat in extent and strength, the disk color constant. The Sierra Blanca specimens and the Las Cruces female are darker in color, less grayish buff in general tone, more brown buff, the pale areas duller and dark areas more extensive. The Grand Canyon female is more like the Sierra Blanca specimens, and, in addition, has the wing-band broader than in any of the other specimens.

Measurements (in millimeters)

	Length of body	Length of pronotum	Greatest (caudal) width of pronotum	Length of tegmen	Length of caudal femur
♂					
Pecos, Texas, <i>type</i>	19.3	3.6	3.4	20.5	11
Pecos, Texas, <i>paratype</i>	20.2	3.9	3.5	22	11
Pecos, Texas, <i>paratype</i>	18.8	4	3.5	21.4	11.4
Sierra Blanca, Texas	18.2	3.8	3.3	20	10.2
♀					
Pecos, Texas, <i>allotype</i>	30.2	5.3	4.8	26.8	14.5
Pecos, Texas, <i>paratype</i>	26.2	4.6	4.2	25.5	13.5
Pecos, Texas, <i>paratype</i>	31.3	5.8	4.9	28.5	15
Sierra Blanca, Texas	24.4	4.9	4.2	23.8	12
Sierra Blanca, Texas	26	5.1	4.5	24.8	13.5
Las Cruces, New Mexico	26.2	5	4.2	26.4	12.8
Grand Canyon, Arizona	25.4	4.6	4	24	12.2

This most interesting species, which is so inconspicuous when at rest in its native environment, and which displays such beautifully colored wings when in flight, is apparently extremely local, and as our material shows has a relatively extensive distribution, of which, at this writing, our knowledge is very incomplete. We have before us a paratypic series of fourteen males and twenty females bearing the same data as the type and allotype; a series of four males and three females taken at Sierra Blanca, El Paso County, Texas, elevation, 4524 to 4950 feet, September 13 to 14, 1912, (Rehn and Hebard); one female, taken at Las Cruces, Donna Ana County, New Mexico on August 5; and a female taken on the plateau below Bright Angel in the Grand Canyon of the Colorado, Coconino County, Arizona, elevation 3500 to 3800 feet, September 12, 1907, (Hebard).

At Pecos the species occurred on the bare spots of an adobe flat, where it was fairly numerous, but very shy and in scattered

colonies. At Sierra Blanca the species was also taken on bare adobe, while on the rocky hills at the same place its relative *Mestobregma plattei corrugata* occurred.

The species shows a distinct tendency toward *Trepidulus*, but it is clearly a *Mestobregma*. It shows, however, the probable line of relationship of the two genera. A species of *Trepidulus* shows an approximately similar tendency toward *Mestobregma*, but the gap between the two remains sufficient to indicate the generic affinities of the respective species.

The Genus Psinidia Stål

This genus is composed of two quite distinct species, *P. ampli-cornus* Caudell and *P. fenestralis* (Serville). The former was described as a variety, but is very distinct and its distribution within the United States can now be indicated with considerable exactness. The second species, *fenestralis*, is divisible into two geographic races; one, the typical form, distributed over a very extensive area, and the other, which was undescribed, restricted as far as known, to the coastal region of Texas, occurring at the same localities as the very different *amplicornus*.

Typical *fenestralis* ranges from the most northern points of the species distribution south, in suitable environments, to southern Florida and southwest to at least southern Alabama (Flomaton) and the coastal islands of Mississippi (Cat and Ship Islands). Material from Hearne, Robertson County, Texas, is essentially intermediate between the two races.

Psinidia fenestralis frater new subspecies (Plate XXVII, figs. 16, 17 and 18; plate XXVIII, figs. 18 and 19.)

This geographic race can be distinguished from typical *fenestralis* (see plate XXVII, figs. 19, 20 and 21) by its greater size, by having the antennae broader and more ensiform in the proximal two-thirds, by the more declivent fastigium and more evident elevation of the vertex, by the head being more compressed when seen in cephalic aspect, by the median carina of the pronotum being slightly lower and not as straight in profile, the ventro-caudal angle of the lateral lobes of the pronotum more distinct and peg-like, the distal extremity of the tegmina more truncate and less rounded and the jaws of the ovipositor of the female more elongate, more slender and straighter in profile.

Type.—♀; Katherine, Willacy County, Texas. August 8, 1912. (Rehn and Hebard; in nearly bare white sand gully.) [Hebard Collection, Type no. 499.]

Allotype.—♂; same data as type. [Hebard Collection.]

Description.—Size larger than in *P. f. fenestralis*: form elongate. Head with occiput more appreciably ascending than in *P. f. fenestralis*, with head in normal position; vertex in profile more narrowly rounded, the juxta-ocular portions of the fastigial marginal carinae more evident in same view; in profile the fastigium is seen to be slightly more declivent: in cephalic aspect the head is seen to be more compressed and proportionately deeper: antennae heavier, very elongate, at least two and one-half times as long as pronotum, distinctly though not decidedly ensiform, the greatest expansion distinctly greater than width of the proximal joint. Pronotum in profile with the median carina subconcave in the region of the principal transverse sulcus, not straight, as a whole lower throughout than in *P. f. fenestralis*: lateral lobes with ventro-caudal angle having a distinct, slightly swollen, peg-like projection instead of an angulation of the margin. Tegmina with the distal extremity oblique, moderately truncate, not essentially rounded as in *P. f. fenestralis*. Dorsal ovipositor jaws in dorsal view no more slender than in *P. f. fenestralis*, in lateral view more elongate and regularly falciform distad of the shoulder, slender: ventral ovipositor jaws in ventral view slightly more elongate than in the typical form of the species, in profile as elongate, correspondingly, as the dorsal pair, much straighter than in *P. f. fenestralis* and more acute.

Coloration not distinctively different from *P. f. fenestralis*.

Measurements (in millimeters)

♂	Length of body	Length of antenna	Length of pronotum	Length of tegmen	Length of caudal femur
<i>P. fen. fenestralis</i>					
Wood's Hole, Mass.	16.8	13.7	3.5	18	11
Isle of Palms, So. Car.	20.8	14.2	3.9	21.2	12.5
Ship Island, Miss.	18.2	13	3.6	19.5	11
<i>P. fen. fenestralis</i> ×					
<i>P. fen. frater</i>					
Hearne, Texas.	20.7	12.5	4	21.5	12.5
<i>P. fen. frater</i>					
Galveston, Texas, <i>paratype</i>	23	17.4	4.7	23.6	14.8
Katherine, Texas, <i>allotype</i>	24	—	5.4	26.5	16.2
♀					
<i>P. fen. fenestralis</i>					
Wood's Hole, Mass.	23.5	12	4.8	20.8	12.5
Isle of Palms, So. Car.	27.2 ¹⁹	13.5	4.7	24.2	14
Ship Island, Miss.	23.8	11.5	4.5	22.7	13.2

♀	Length of body	Length of antenna	Length of pronotum	Length of tegmen	Length of caudal femur
<i>P. fen. fenestralis</i> ×					
<i>P. fen. frater</i>					
Hearne, Texas	27.5 ¹⁹	10.5	5	24.8	14.8
<i>P. fen. frater</i>					
Galveston, Texas, <i>paratype</i>	29	16.5	6.3	27.8	17.5
Katherine, Texas, <i>type</i> . . .	30.5	16.3	6.1	29	16.7
Katherine, Texas, <i>paratype</i>	37 ¹⁹	18	6.6	31.2	19
Between Alice and Brownsville, Texas, <i>paratype</i> . .	30.8	15.8	5.7	28.4	16.2

The individuals of *P. fenestralis fenestralis* measured above are average specimens from fair-sized series.

In addition to the type and allotype we have before us the specimens measured above, which are: an additional female from Katherine, Texas, bearing the same data as the type and allotype; a pair from Galveston, Galveston County, Texas, taken July 19 to 21, 1912, (Hebard; sandy spots back from beach), and a single female from between Alice and Brownsville, Texas, taken in July. With the exception of the latter specimen, which is from the collection of the Brooklyn Institute of Arts and Sciences, the series is contained in the Philadelphia collections. These additional specimens are considered paratypes. A series of two males and three females taken in Hearne, Robertson County, Texas, August 14 to 15, 1915, (Hebard; in moderate numbers on sandy area near woods), contained in the Philadelphia collections, is virtually intermediate between *P. fen. fenestralis* and *P. fen. frater* in the structural differential characters.

The Caeruleipennis Group of the Genus Anconia

The genus *Anconia* is made up of two groups, one centering about *A. integra*, the genotype, and the other composed of *A. caeruleipennis* Bruner and the new species here described. Bruner's *caeruleipennis*²⁰ is known only from the unique female type, which is now before us. In 1909, Rehn and Hebard referred material taken in the vicinity of El Paso, Texas, to *caeruleipennis*, having at that time only the brief description of the latter with which to work. With the type in hand we can now definitely

¹⁹ Abdomen unnaturally extended, the measurement probably ten per cent in excess of repose length.

²⁰ 1906. Biol. Cent.-Amer., Orth., ii, pp. 185, 186. [Hawthorne, Nevada.]

state that the Texas material represents a quite distinct new species, which we here describe.

Anconia hebardi new species (Plate XXVII, figs. 22, 23 and 24; plate XXVIII, figs. 21 and 22.)

1909. *Anconia caeruleipennis* Rehn and Hebard (not of Bruner), Proc. Acad. Nat. Sci., Phila., 1909, p. 155. [Franklin Mountains, Texas; El Paso, Texas.]

A near relative of *caeruleipennis* (see plate XXVII, figs. 25 and 26, plate XXVIII, fig. 20), differing in the more rugulose pronotum, which has more evident individual bullation of the prozona and metazona when seen in profile, in the interantennal portion of the frontal costa being narrower, the tegmina narrower and with a more coriaceous structure and much more closely woven venational pattern, in the more closely woven venational pattern of the wings, in the rich blue, instead of weakly bluish, color of the wing disk and in the more robust caudal femora.

Type.—♀; El Paso, El Paso County, Texas. Elevation, 3650 feet. July 10, 1907. (Rehn and Hebard; irrigated land along Rio Grande.) [Hebard Collection, Type no. 507.]

Description of Type.—Size moderately large; form moderately elongate, but meso and metathorax relatively robust, pronotum less than average size for general bulk, head small; surface of head and dorsal and lateral portions of thoracic segments rugulose.

Head with its exposed dorsal length hardly more than half that of pronotal disk, the depth of head to clypeal suture no greater than that of pronotum to ventral margin of the lateral lobes: occiput, vertex and fastigium evenly arcuate in profile; fastigio-facial angle moderately prominent, rounded, the inter-antennal production moderately flattened in profile, immediately ventrad of the insertion of the antennae the facial profile is appreciably concave, thence gently retreating ventrad to the clypeus: fastigium with its length and breadth subequal, indicated chiefly by a pair of shallow pit-like depressions caudad and a pair of triangular impressions cephalad; lateral margins weakly indicated, moderately converging caudad, more decidedly converging cephalad; median carina weak but apparent, connecting by a weakly indicated V-shaped fork with the lateral margins of the fastigium, which latter it delimits ventrocephalad: frontal costa but faintly sulcate dorsad of the median ocellus, more distinctly so for a short distance ventrad of the same; costa faintly and broadly constricted dorsad at its junction with the fastigium, thence gently expanding to between the antennal bases, when it is slightly broader than the proximal antennal joint, thence moderately narrowing around the median ocellus, subequal for a distance to near the clypeal suture, where the subobsolete margins diverge sharply and irregularly. Eyes but moderately prominent, when seen from cephalic aspect with the width across them subequal to that across genae; basal outline of eye broad subreniform ovate, the depth faintly greater

than that of the infra-ocular sulcus. Antennae relatively short, less than the dorsal length of the head and pronotum combined, simple, slender, sub-depressed proximad (except for the two proximal segments), apex appreciably cochleate ventrad.

Pronotum narrowing cephalad, broad caudad, in dorsal silhouette regularly enlarging caudad, greatest (caudal) width of metazonal disk slightly less than greatest length of disk; in profile the prozonal (*sensu latiore*) portion of disk is moderately but very appreciably sub-bullate, higher cephalad than caudad, in section subtectate, metazonal section gently arcuate in profile, but not at all bullate: surface of pronotum irregularly, but generally transverse, rugulose on prozona; cribroso-punctulate on metazona, lateral lobes as well as disk: cephalic margin of disk weakly obtuse-angulate, the immediate angle narrowly truncate, small but appreciable and well-spaced strumositities beading the cephalic margin of disk and to an extent on dorsal section of lateral lobes; caudal margin of disk broad sub-arcuate obtuse-angulate, the margins appreciably sinuate, cingulate: metazona almost one and a half times the prozonal length: median carina of disk delicate but evident, although subobsolete shortly cephalad of the transverse sulcus, weakly subcristate near cephalic margin; lateral carinae obsolete, on prozona represented solely by several small nodes; metazonal shoulders decided but broadly rounded, non-carinate: usual median mesozonal elevation weakly indicated by a sublongitudinal horse-shoe shaped area outlined by carinulations, little distinct, however, in the general sub-tumidity of that section: principal transverse sulcus deeply impressed, the prozonal sulci evident, but less deeply, on the lateral portions of disk and lateral lobes, obsolete near median line. Lateral lobes of pronotum with greatest depth subequal to greatest dorsal length, the greatest depth caudad; cephalic margin moderately sinuate; ventro-cephalic angle narrowly rounded rectangulate; ventral margin arcuate-emarginate cephalad, with the ventro-caudal angle moderately arcuate; caudal margin nearly straight, faintly oblique: surface of prozona of lobes in general smoother than metazona, but with several obliquely disposed subacute, though relatively low, nodes.

Tegmina but slightly surpassing the apex of the abdomen, their greatest breadth contained slightly more than five times in their length: texture markedly coriaceous proximad and mesad, becoming more transparent in distal portion: areolation as a whole close, very close in the coriaceous section, distad the individual areolae average nearly quadrate: costal margin with a distinct and rather elongate, though but moderately deep, proximal lobation, in distal third the margin is regularly arcuate to the rounded rectangulate apex, where the tegmen is but two-fifths as wide as at widest point; sutural margin in general nearly straight, distal concavity appreciable but very slight; distal margin strongly oblique, moderately arcuate: intercalary vein distinct, proximad equidistant from the median and ulnar veins, distad quite close to the median vein: anal field broad, at widest point equal to two-fifths of the entire tegminal width. Wings moderately elongate, their greatest width contained one and four-fifths times in the greatest length of the same; apex rounded rectangulate; axillary field arcuate lobulate: areolation of anterior

and axillary fields regular, close, relatively small, the areolae in general quadrate, proximad the cross-veins are very close and much more numerous than in *A. caeruleipennis*.

Interspace between the mesosternal lobes quadrate, slightly transverse, the margin of the lobes rounded meso-caudad: interspace between the metasternal lobes moderately transverse, faintly narrower than the mesosternal interspace. Ovipositor jaws relatively heavy, subcompressed, little recurved, jaws blunted.

Cephalic and median limbs of medium length. Caudal femora of average form, in length slightly more than half the length of the tegmen, greatest depth contained three and three-quarters times in the greatest length; lamellation of dorsal carina weakly indicated in proximal half; external pagina regularly and sharply pictured: caudal tibiae slightly shorter than the caudal femora, armed on the external margin with eight to nine spines, on internal margin with ten to eleven spines, the internal spines slightly longer than external spines, the internal spines appreciably curved: caudal tarsi short, metatarsus subequal in length to the remaining tarsal joints.

Allotype.—♂; El Paso, El Paso County, Texas. Elevation, 4200 feet. July 11, 1907. (Rehn and Hebard; edge of mesa.) [Hebard Collection.]

Description of Allotype.—Differing from the description of the female in the following noteworthy features. Size relatively and proportionately small: form more slender than in female sex. Fastigium slightly more longitudinal than in female, excavation of fastigium and prominence of median carina more evident than in female sex; frontal costa of the general type of the female but narrower, with the constriction subobsolete, sulcation distinct, quite deep and continuous from fastigium to a short distance dorsad of the clypeal suture: width across eyes very distinctly greater than that across genae, the latter nearly vertical. Eyes large, very prominent, the depth equal to one and one-half times that of the infra-ocular sulcus. Antennae slightly longer than the length of the head and pronotum, very faintly enlarged distad. Tegmina surpassing the apex of the abdomen by slightly more than the combined length of the head and pronotum, greatest width of tegmen contained nearly six times in greatest length of same, width of tegmen at distal margin about half that at point of greatest width. Wings with the greatest width contained twice in the greatest length of the same. Interspace between the mesosternal lobes quadrate, faintly transverse: interspace between the metasternal lobes quadrato-cuneate. Caudal tibiae with nine external and ten internal spines.

General color tulleul-buff to vinaceous-buff, occasionally with head and thorax, as well as proximal portion of the tegmina, but all to variable degrees, washed with very weak chamois to cinnamon-buff, the face frequently nearly hoary white. Venter and abdomen largely hoary white in individuals not discolored, dorsal surface of abdomen washed proximad with orient blue and deep orient blue to porcelain blue, this variable in depth and always extending distad as a thread for a considerable distance along the dorsal carina of the abdomen. Eyes ochraceous-buff to buckthorn brown. Antennae

obscurely annulate ochraceous and dull brown, occasionally washed with rufescent. Rarely the fastigium, face and genae obscurely and rather minutely mottled with greenish blue and rufescent. Pronotum with caudal margin of disk obscurely and sparsely beaded with dark; rarely the vicinity of the humeral shoulders is washed with rufescent; occasionally the disk is obscurely and finely mottled with pale greenish. Tegmina with rather obscure markings of bone brown, which are as a rule areolate, forming, however, three principal groupings or broken transverse bands, one at proximal fourth, one mesad and the third near the distal third; these bands are not at all complete, are irregular in outline and more evident in the male sex than in the female; the distal one is obsolete in several specimens and the distal section and the anal field are supplied with a variable number of areolae of the darker color, these not strongly contrasted. Wings with disk a beautiful chapman's blue, regularly paling distad, the blue much less extended on anterior field than elsewhere; no wing-band present; veins along costal margin, in the usual position of the spur, and in the areas which are distad of the wing band in species so supplied, fuscous. Limbs largely hoary white, clouded, subannulate and mottled to variable degrees with weak dull blue-gray; carinae of caudal femora sparsely and irregularly beaded with blackish brown; genicular arches of caudal femora yellow ocher, bordered ventrad by a broad patch of dull fuscous: caudal tibiae hoary white with a faint wash of pale veronese green, proximad with bluish gray cloudings; spines brownish distad, black tipped. Ovipositor jaws tipped and margined with bone brown.

Measurements (in millimeters)

	♂	Length of body	Length of pronotum	Greatest (caudal) width of pronotum	Length of tegmen	Length of caudal femur
El Paso, Texas, <i>paratype</i>		23	4.9	4.3	24.5	12.3
El Paso, Texas, <i>allotype</i>		23.4	5	4.2	25.2	13.3
	♀					
El Paso, Texas, <i>type</i>		40.6	7.2	6.2	34	18.5
El Paso, Texas, <i>paratype</i>		39.3	7	6	34	18
Franklin Mountains, Texas, <i>paratype</i>		33.5	7	5.8	31.5	17

All of the material of this species which we have seen has already been reported by Rehn and Hebard. We have at this writing nothing further to add to the habitat information already published. All of the nine specimens (two males, seven females) previously reported are now before us and are, other than the type and allotype, considered paratypes.

We take great pleasure in dedicating this beautiful, interesting and rare species to our colleague, Mr. Morgan Hebard, as a slight token of appreciation of his excellent and indefatigable work in the field and in the laboratory, and of a friendship of many years.

EXPLANATION OF PLATES

Plate XXVI

- Fig. 1.—*Derotmema haydenii mesembrinum* new subspecies. Lateral outline of head and pronotum of male (*type*). Double Windmill, Texas. ($\times 6$)
- Fig. 2.—*Derotmema haydenii mesembrinum* new subspecies. Dorsal outline of head and pronotum of female (*allotype*). Marfa, Texas. ($\times 4$)
- Fig. 3.—*Derotmema haydenii haydenii* (Thomas). Lateral outline of head and pronotum of male. Cheyenne, Wyoming. ($\times 6$)
- Fig. 4.—*Derotmema haydenii haydenii* (Thomas). Dorsal outline of head and pronotum of female. Cheyenne, Wyoming. ($\times 4\frac{1}{2}$)
- Fig. 5.—*Derotmema piute* new species. Cephalic outline of head of female (*type*). Mason, Nevada. ($\times 4\frac{1}{2}$)
- Fig. 6.—*Derotmema piute* new species. Dorsal outline of head and pronotum of female (*type*). Mason, Nevada. ($\times 4\frac{1}{2}$)
- Fig. 7.—*Derotmema piute* new species. Lateral outline of head and pronotum of female (*type*). Mason, Nevada. ($\times 4\frac{1}{2}$)
- Fig. 8.—*Derotmema piute* new species. Lateral outline of ovipositor jaws of female (*type*). Mason, Nevada. ($\times 10$)
- Fig. 9.—*Mestobregma impexum* new species. Lateral outline of head and pronotum of male (*type*). Milford, Utah. ($\times 5$)
- Fig. 10.—*Mestobregma impexum* new species. Cephalic outline of head of male (*type*). Milford, Utah. ($\times 5$)
- Fig. 11.—*Mestobregma plattei plattei* (Thomas). Lateral outline of head and pronotum of male. Newcastle, Wyoming. ($\times 5$)
- Fig. 12.—*Mestobregma plattei plattei* (Thomas). Cephalic outline of head of male. Newcastle, Wyoming. ($\times 5$)
- Fig. 13.—*Mestobregma terricolor* new species. Cephalic outline of head of male (*type*). Pecos, Texas. ($\times 5$)
- Fig. 14.—*Mestobregma terricolor* new species. Lateral outline of head and pronotum of male (*type*). Pecos, Texas. ($\times 5$)
- Fig. 15.—*Mestobregma terricolor* new species. Dorsal outline of head and pronotum of male (*type*). Pecos, Texas. ($\times 5$)

Plate XXVII

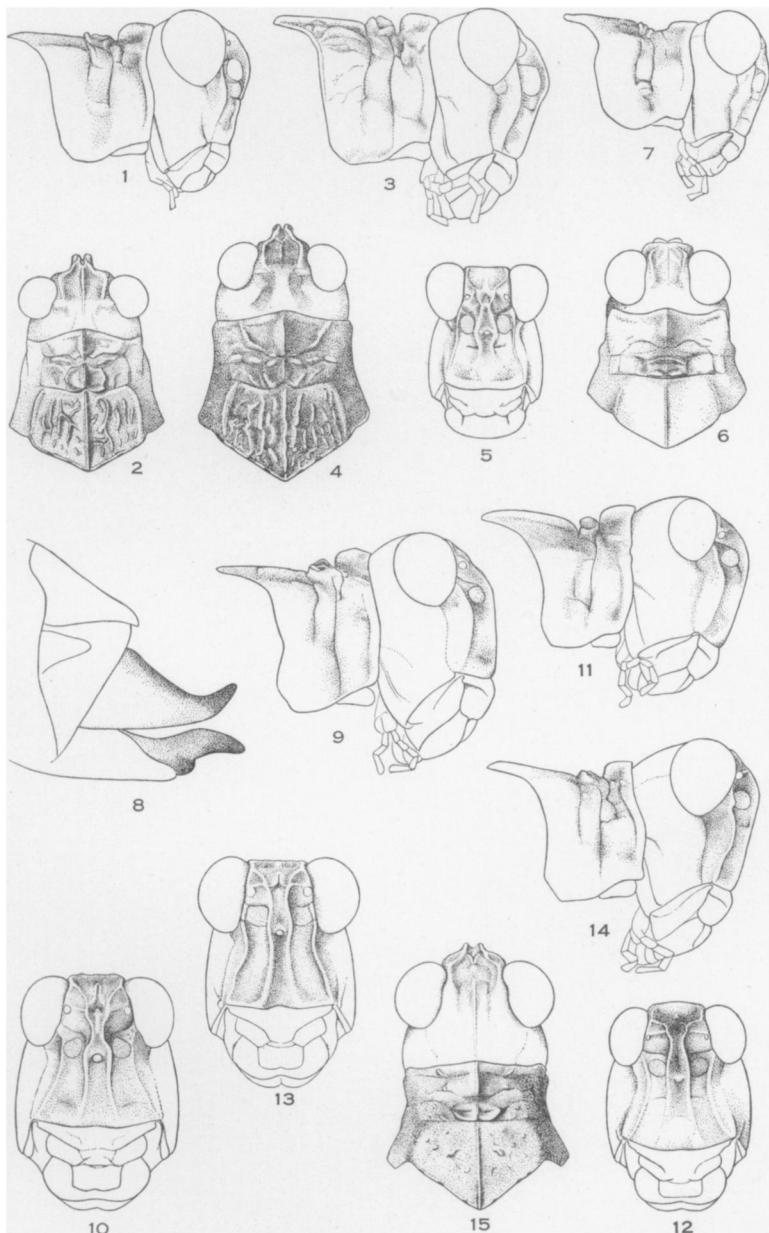
- Fig. 16.—*Psinidia fenestralis frater* new subspecies. Lateral outline of head and pronotum of female (*type*). Katherine, Texas. ($\times 4$)
- Fig. 17.—*Psinidia fenestralis frater* new subspecies. Lateral outline of ovipositor jaws of female (*type*). Katherine, Texas. ($\times 12$)
- Fig. 18.—*Psinidia fenestralis frater* new subspecies. Dorsal view of antenna of female (*type*). Katherine, Texas. ($\times 4\frac{1}{2}$)
- Fig. 19.—*Psinidia fenestralis fenestralis* (Serville). Lateral outline of head and pronotum of female. De Leon Springs, Florida. ($\times 5\frac{1}{2}$)
- Fig. 20.—*Psinidia fenestralis fenestralis* (Serville). Lateral outline of ovipositor jaws of female. De Leon Springs, Florida. ($\times 10$)
- Fig. 21.—*Psinidia fenestralis fenestralis* (Serville). Dorsal view of antenna of female. De Leon Springs, Florida. ($\times 6$)

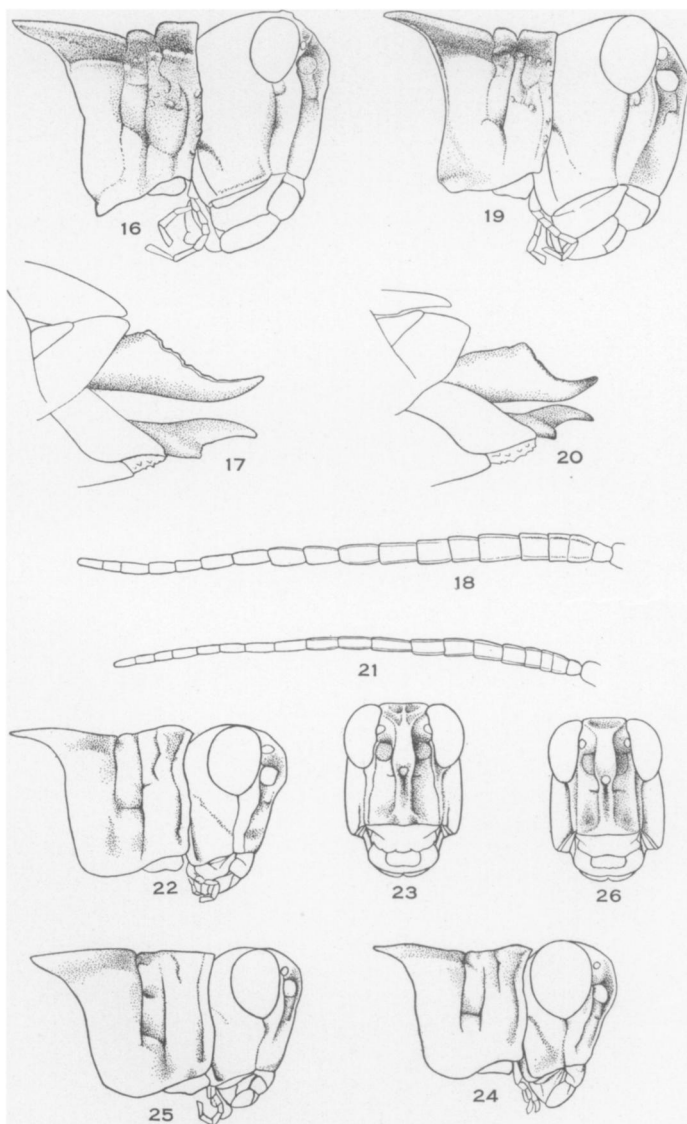
- Fig. 22.—*Anconia hebardii* new species. Lateral outline of head and pronotum of female (*type*). El Paso, Texas. ($\times 4\frac{1}{2}$)
- Fig. 23.—*Anconia hebardii* new species. Cephalic outline of head of female (*type*). El Paso, Texas. ($\times 4$)
- Fig. 24.—*Anconia hebardii* new species. Lateral outline of head and pronotum of male (*allotype*). El Paso, Texas. ($\times 4$)
- Fig. 25.—*Anconia caeruleipennis* Bruner. Lateral outline of head and pronotum of female (*type*). Hawthorne, Nevada. ($\times 2\frac{1}{2}$)
- Fig. 26.—*Anconia caeruleipennis* Bruner. Cephalic outline of head of female (*type*). Hawthorne, Nevada. ($\times 4$)

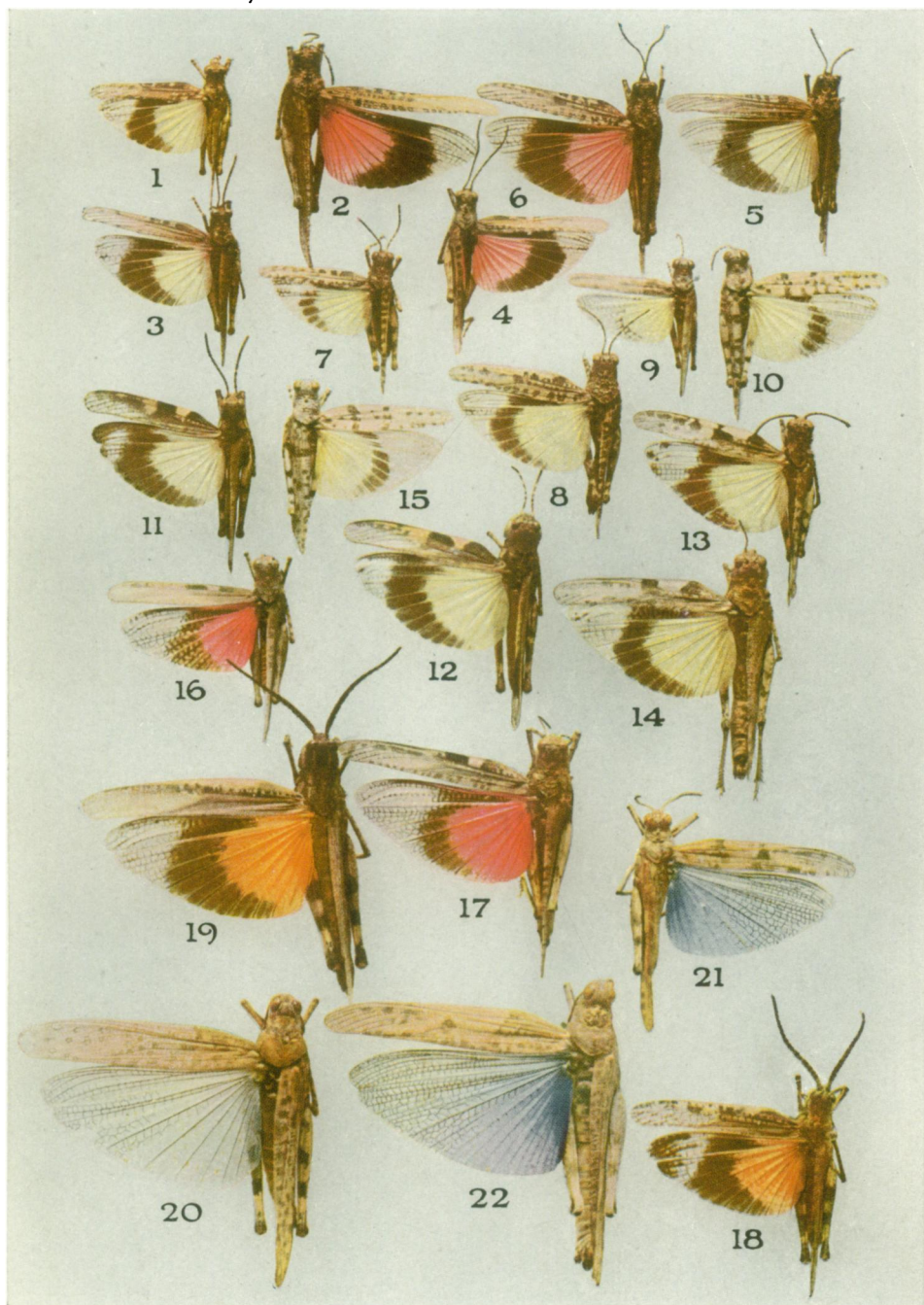
Plate XXVIII

The figures on this plate are reproduced natural size.

- Fig. 1.—*Derotmema haydenii mesembrinum* new subspecies. Male (*type*). Double Windmill, Texas.
- Fig. 2.—*Derotmema haydenii mesembrinum* new subspecies. Female (*allotype*). Marfa, Texas.
- Fig. 3.—*Derotmema haydenii haydenii* (Thomas). Male. Colorado Springs, Colorado.
- Fig. 4.—*Derotmema haydenii haydenii* (Thomas). Male. Near La Junta, Colorado.
- Fig. 5.—*Derotmema haydenii haydenii* (Thomas). Female. Cheyenne, Wyoming.
- Fig. 6.—*Derotmema haydenii haydenii* (Thomas). Female. Knob Hill, Colorado Springs, Colorado.
- Fig. 7.—*Derotmema haydenii rileyianum* (Saussure). Male (*topotype*). Salmon City, Idaho.
- Fig. 8.—*Derotmema haydenii rileyianum* (Saussure). Female. Baker City, Oregon.
- Fig. 9.—*Derotmema piute* new species. Male (*paratype*). Mina, Nevada.
- Fig. 10.—*Derotmema piute* new species. Female (*paratype*). Mina, Nevada.
- Fig. 11.—*Mestobregma plattei plattei* (Thomas). Male. Newcastle, Wyoming.
- Fig. 12.—*Mestobregma plattei plattei* (Thomas). Female. Newcastle, Wyoming.
- Fig. 13.—*Mestobregma impexum* new species. Male (*paratype*). Milford, Utah.
- Fig. 14.—*Mestobregma impexum* new species. Female (*allotype*). Milford, Utah.
- Fig. 15.—*Derotmema piute* new species. Female (*paratype*). Mason, Nevada.
- Fig. 16.—*Mestobregma terricolor* new species. Male (*paratype*). Pecos, Texas.
- Fig. 17.—*Mestobregma terricolor* new species. Female (*paratype*). Pecos, Texas.
- Fig. 18.—*Psinidia fenestralis frater* new subspecies. Male (*paratype*). Galveston, Texas.
- Fig. 19.—*Psinidia fenestralis frater* new subspecies. Female (*paratype*). Katherine, Texas.
- Fig. 20.—*Anconia caeruleipennis* Bruner. Female (*type*). Hawthorne, Nevada.
- Fig. 21.—*Anconia hebardii* new species. Male (*allotype*). El Paso, Texas.
- Fig. 22.—*Anconia hebardii* new species. Female (*type*). El Paso, Texas.







REHN—NORTH AMERICAN OEDIPODINAE